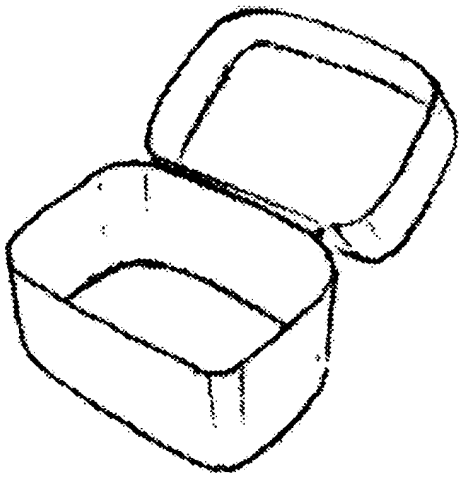
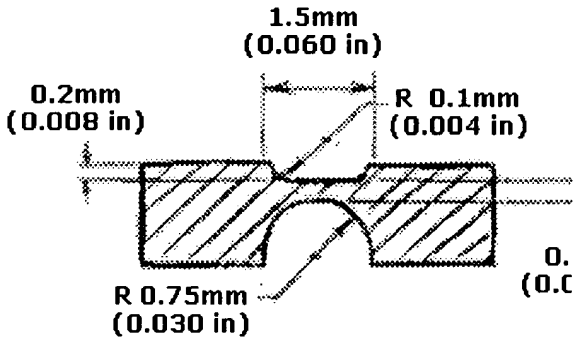
Living Hinge



BOX WITH LIVING HINGE

- Living hinges are thin sections of plastic that connect two segments of a part to keep th and allow the part to be opened and closed. Typically these are used in containers that high volume applications such as toolboxes, fish tackle boxes, CD boxes etc.

- The materials used to make a living hinge are usually a very flexible plastic such as polypropylene and polyethylene. These can flex more than a million cycles without failure.

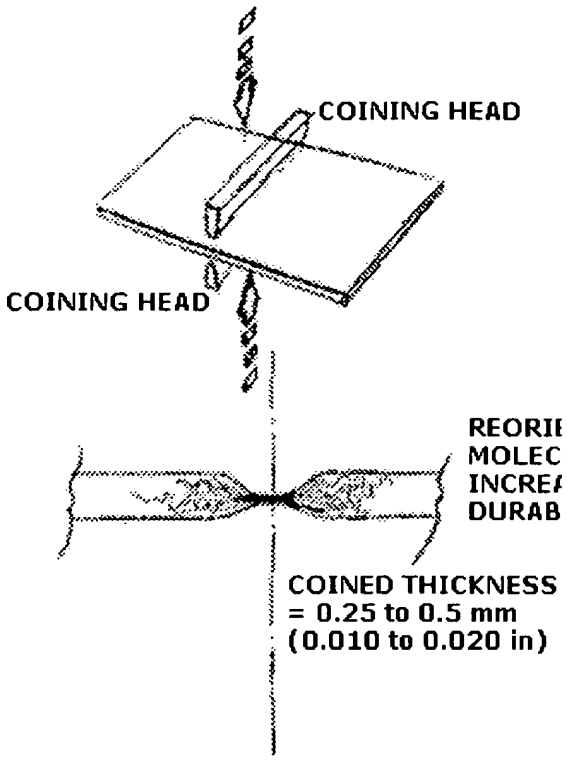


LIVING HINGE DESIGN FOR POLYPROPYLENE AN POLYET

- Besides meeting the design guidelines, the hinges have to be processed properly. The molecules have to be oriented along the hinge line for the hinge to have acceptable life.

- As molded the fibers of the plastic are somewhat random in orientation. In order to orient the fibers to aid in prolonging the hinge life, some or all of the following practices should be followed:

- The gate location should be such as to allow the plastic to flow across the hinge for m strength.
- As the part comes out of the mold, it needs to be flexed a minimum of 2 times while i for optimum strength
- Coining is often done to give the hinge, enhanced properties. The coining process compresses the hinge to a pre-determined thickness. The strain induced is greater than the yield stress of the plastic. This will plastically deform the hinge (i.e. place it outside the elastic range into the plastic range). The amount of coining (compression) should be less than the ultimate stress, to keep the hinge from fracturing.



COINING OF HINGES TO INCREASE DURABLITY CYCLES

- The finished thickness after coining should be from 0.25 to 0.5 mm (0.010 to 0.020 i keeps the stress in the outer fibers from exceeding the yield strength when being flex

This process can also be done by heating the hinge or the coining tool to a temperatu glass transition tempertature of the plastic. This allows for easier coining and somewh properties, as the plastic "flow" easier when being heated.

limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art.); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976) ("mere scaling up of a prior art process capable of being scaled up, if such were the case, would not establish patentability in a claim to an old process so scaled." 531 F.2d at 1053, 189 USPQ at 148.).

In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

B. Changes in Shape

In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) (The court held that the configuration of the claimed disposable plastic nursing container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.).

C. Changes in Sequence of Adding Ingredients

Ex parte Rubin , 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render *prima facie* obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results); *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is *prima facie* obvious.).

V. MAKING PORTABLE, INTEGRAL, SEPARABLE, ADJUSTABLE, OR CONTINUOUS

A. Making Portable

In re Lindberg, 194 F.2d 732, 93 USPQ 23 (CCPA 1952) (Fact that a claimed device is portable or movable is not sufficient by itself to patentably distinguish over an otherwise old device unless there are new or unexpected results.).

B. Making Integral

In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965) (A claim to a fluid transporting vehicle was rejected as obvious over a prior art reference which differed from the prior art in claiming a brake drum integral with a clamping means, whereas the brake disc and clamp of the prior art comprise several parts rigidly secured together as a single unit. The court affirmed the rejection holding, among other reasons, "that the use of a one piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice."); but see *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983) (Claims were directed to a vibratory testing machine (a hard-bearing wheel balancer) comprising a holding structure, a base structure, and a supporting means which form "a single integral and gaplessly continuous piece." Nortron argued that the invention is just making integral what had been made in four bolted pieces. The court found this argument unpersuasive and held that the claims were patentable because the prior art perceived a need for mechanisms to dampen resonance, whereas the inventor eliminated the need for dampening via the one-piece gapless support structure, showing insight that was contrary to the understandings

and expectations of the art.).